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ABSTRACT

The goal of the Exemplary Center for Reading Instruction (ECRI) is to improve elementary and secondary students' ability to use their language--to read fluently and with expression, to understand what they read and hear, and to use this understanding so they can communicate effectively. ECRI is a pre- and in-service program for teachers to learn to teach word recognition skills, vocabulary, comprehension, study skills, spelling, penmanship, proofing, creative and expository writing, and literature. ECRI's teaching methods focus on individualized instruction techniques and positive reinforcement. Teachers teach reading and other language skills using dialogues or directives that have been written so that their teaching is efficient and utilizes strategies that are multisensory and sequential. Criterion-referenced tests of mastery are written for the reading and/or content materials and are administered as students complete various activities. Per-student costs are approximately $10.72 for start-up, with negligible costs thereafter. Evaluation of the impact of ECRI was conducted at 11 sites in 1990 and at 6 sites in 1996 as part of school district testing programs using standardized achievement tests. Results indicated "exemplary" gains for almost every regular education, special needs, and special education group. The combination of a comparison group design with norm-referenced measures and the consistency and size of the gains across more than 200 separate groups and over 4000 students make the data unequivocally supportive of the effectiveness of the program. (Contains 13 tables of data.) (RS)

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ED 414 560

PROGRAM AREA: Reading/language instruction for gifted, regular, remedial, and special education students

I. TITLE: Exemplary Center for Reading Instruction (ECRI)
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II. DEVELOPED BY: Dr. Ethna R. Reid

III. FUNDING: Originally, Title III monies and local funds

IV. YEARS OF DEVELOPMENT: Validation 1990
Current Evaluation 1991-1995

V. BRIEF DESCRIPTION OF THE PROGRAM:

Goal

The goal of ECRI is to improve elementary and secondary students' ability to use their language—that is, their ability to read fluently and with expression, to understand what they read and hear, and to use this understanding so they can communicate effectively.

Overview

ECRI is a pre- and in-service program for teachers to learn to teach word recognition skills, vocabulary, comprehension, study skills, spelling, penmanship, proofing, creative and expository writing, and literature. ECRI teaches teachers how to: teach reading and other language arts within the context of any subject area, utilize effective instructional strategies that prevent failure, and develop a management system that assists a school/district staff to rethink their instructional efforts and the structure of the school so all students learn.

In-service for teachers is based on research findings of ECRI and other studies of effective instruction. Teachers learn to utilize specific teaching behaviors such as the ability to elicit accurate and rapid overt responses from students during instruction, maintain on-task behavior, diagnose and prescribe when errors or no responses occur, reinforce correct responses, integrate the teaching of language skills, model and prompt during instruction, and evaluate progress toward and mastery of skills. Teachers learn to teach students to schedule their time and to keep personal progress records.

Intended Audience

The Exemplary Center for Reading Instruction approach has proven successful with students from all socioeconomic levels, for different cultural groups and age levels, and with students with special needs. ECRI received JDRP certification in 1974 and 1985 and PEP certification in 1990. New validation data has been submitted in 1996. In the 1990 certification, regular education ECRI students in eight different national sites demonstrated significantly greater gains ($p<.01$) on the reading subscale of standardized tests than (1) comparison group students receiving their regular reading instruction and (2) expectancies derived from national normative data. Special needs ECRI

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students (Title I, bilingual, remedial) in five other national sites and special education students (learning disabled) in four sites demonstrated significantly ($p<.01$) greater than expected gains (derived from national normative data) on the Total Reading composite scales of standardized achievement tests.

In the 1996 evaluation, gifted, regular education, special needs, and special education students in six different national sites also demonstrated significantly greater gains ($p<.01$) on the reading subtests of standardized achievement tests. These data have provided convincing evidence of effectiveness from gifted, regular education, Title I, bilingual, remedial, and learning disabled students, and students from rural and urban settings and from the full range of SES strata at grades K-12. In the current submittal, evidence of effectiveness is presented for students of all ability levels in grades 1 through 11 from the same range of settings and SES strata as previously described.

Salient Features

The program has several key features that make it unique and innovative. Each of these features is described below.

Curriculum/Instructional Approach: ECRI's teaching methods focus on individualized instruction techniques and positive reinforcement. Specifically, teachers are taught how to teach reading and language skills, establish mastery levels of responses with performance and rate as criteria, provide time for supervised practice, integrate language arts activities, utilize effective management and monitoring systems, and diagnose and prescribe instantly when errors or no responses occur.

ECRI teachers have high mastery expectations of students (83 to 100 percent). A student moves ahead in his/her reading as he/she demonstrates mastery of reading and spelling new words, mastery of word recognition and comprehension skills. In an ECRI classroom, a student progresses independently of other students in his/her practice of new skills and in his/her work in materials. No student waits for another. Based upon instructional reading levels, students are instructed in small groups in those language skills that they will need in future work.

Teachers are expected to teach reading and other language skills using dialogues or directives that have been written so that their teaching is efficient and utilizes strategies that are multisensory and sequential. ECRI teacher texts provide these directives plus a rationale based upon research, a glossary of terms, self-instructional and self-correctional exercises, and proficiency checklists.

ECRI helps teachers to establish objectives and a skills sequence from their reading materials, to provide time for students to master the skills they have taught, to administer formative tests, to reteach when incorrect responses occur, and to certify the students' learning with mastery tests that have been written for the materials currently in use in their schools. The basic philosophy of ECRI is that, given quality instruction, all students can learn.

In a typical skills lesson, the teacher introduces new words in one of at least eight different methods of instruction. The teacher also teaches at least one comprehension skill, a study skill, a literature concept, and a grammar or creative and expository writing skill. The teacher reviews words and word recognition skills previously taught. In a backup skills lesson, students are taught to spell, write, and proof the words they have learned to read. It is during the teaching of spelling,

penmanship, and proofing through dictation that visual and auditory discrimination and sequential memory are strengthened. Teachers model for students during instruction so that students make few errors as they learn, and hence are able to discriminate fine differences in their work when compared to others. Teachers prompt as needed and gradually fade the prompts until students respond correctly without assistance.

A practice time that is equally as long as the skills instruction is provided. Teachers hold individual conferences (checking on students' progress toward mastery), test for mastery, and call small groups together for discussions during this period of time. Students learn to diagnose and prescribe for errors that they could make and how to judge when they are ready to take a mastery test. Mastery tests are performance-based, individually administered, and in either oral or written form.

Teachers continue to use their existing reading and/or content materials, but ECRI helps to maximize their effectiveness. Skills that are lacking are added during instruction. For example, teachers learn to teach at least 1500 new words with their accompanying word recognition skills, and 90 comprehension and 90 study skills in a school year. These skills are not isolated from the context in which they appear.

Teachers learn to administer informal reading inventories to place students in reading materials at their instructional levels. Although students are taught in small groups, student advancement is dependent upon mastery.

Students' attention is sustained with the momentum of the teacher directives during instruction and reinforcement offered during practice time. A preliminary period of orientation is provided during which the class works together to learn the procedures. The students are then released to progress at their own pace.

Criterion-referenced Mastery: Criterion-referenced tests of mastery are written for the reading and/or content materials and are administered as students complete an oral/silent reading, a practice of the reading and spelling of the new words, and writing, speaking, and listening activities. Hands-on experiences are provided in the content areas. Levels of expectations on mastery tests vary according to studies of their effect on retention.

Staff Development: Teachers learning the basic Exemplary Center for Reading Instruction techniques are required to attend a five-day seminar. During the seminar, they learn to teach reading and language skills using the new teaching techniques and to teach students to schedule their time efficiently and use a simple but effective record keeping system. Teachers also learn to select a schedule that fits the existing time frame for instruction in their schools.

During seminars, teachers observe demonstrations given by the trainer and are given opportunities to teach. They also pass proficiency tests in their use of the new techniques. Teachers learn to implement the best teaching practices and strategies for achieving mastery.

Instructional Materials for the Teacher

Teaching Letter Names and Sounds
Teaching New Words Through Phonics

Teaching New Words Through the Word Structure Methods
Teaching New Words Through the Sight and Context Methods
Teaching Spelling Skills
Teaching Manuscript and Cursive Penmanship
Eliciting Responses and Teaching Proofing Through Dictation
Teaching Creative Comprehension
Teaching Literal and Inferential Comprehension
Teaching Critical Comprehension
Teaching Study Skills, Books 1 and 2
Teaching Scheduling and Record Keeping
Teaching Grammar for Sentence Reading and Writing, Books 1 and 2
Teaching Writing (Creative and Expository) Skills, Books 1 and 2
Teaching Literature
Personally Speaking
Informal Reading Inventories (Parts 1 and 2), (Part 3), (Parts 4 and 5)
Lesson Plan Book

Teachers also need the teacher's text for their district's adopted penmanship program and student materials for other subjects.

Teachers can reproduce a teacher record form as needed for recording dates on which students pass their mastery tests. This record form is found in the *Teaching Scheduling and Record Keeping* text.

As teachers become proficient in their use of ECRI's techniques, they are able to teach reading skills with content materials. When this occurs, subject matter texts found in the classroom are also used.

Learning Materials for the Student

A basic reading or literature text (usually already available in the school)
Mastery tests for the text
Enrichment reading materials
A student folder with student record form, practice time checklist, timed reading practices form, enrichment reading form, and a mastery test card (to be reproduced from the *Teaching Scheduling and Record Keeping* text)

Costs

Over the past five years, ECRI has averaged approximately 35 teachers per five-day training session. The following costs, therefore, are based on an average ECRI seminar.

	Installation	Recurring
Personnel	0	0
Training	$500 honorarium/day x 5 days = $2500.00 *	0**
Facilities	0	0
Equipment	0	0
Required Teacher Texts	$197.00/teacher	0
Consumables	0	$3/classroom/year (reproduced at school)
TOTAL FOR 35 TEACHERS	$9395.00	$105.00
PER TEACHER	268.00	3.00

* Travel expenses are also necessary.
** Advanced training is optional.

ECRI costs average about $268.00 per classroom for installation ($197.00 for materials and $71 for five days of training) and about $3.00 per classroom each year following. The per-student costs (assuming 25 students per class) is approximately $10.72 start-up, with negligible costs thereafter.

VI. EVIDENCE OF EFFECTIVENESS

Claims of Effectiveness (1990)

1. Regular education ECRI students (grades 1-10) will demonstrate significantly greater gains ($p<.01$) on the reading subscales of standardized achievement tests than (1) comparison group students receiving their regular reading instruction and (2) expectancies derived from national normative data.

2. Special needs ECRI students (Title I, bilingual, remedial) will demonstrate significantly ($p<.05$) greater than expected gains (derived from national normative data) on the Total Reading composite scales of standardized achievement tests.

3. Special education students (learning disabled) will demonstrate significantly ($p<.05$) greater than expected gains (derived from national normative data) on the Total Reading composite scales of standardized achievement tests.

Claims of Effectiveness (1996)

Gifted, regular education, special needs, and special education students (grades 1-11) will demonstrate significantly greater gains ($p<.01$) on the reading subscales and Total Reading composite scores of standardized achievement tests than (1) comparison group students receiving their regular reading instruction and (2) expectancies derived from national normative data.

Evaluation Design (1990 and 1996)

To support its claims of effectiveness, ECRI has presented actual data collected in the field. All available data pertaining to the student groups for which the program claims effectiveness have been presented. No selectivity has taken place. It must also be mentioned that the data presented parallel the positive formal and informal reports from the hundreds of sites which have adopted ECRI over the past 15 years.

All evaluations detailed in this report were conducted as part of school district testing programs. As a consequence, the norm-referenced design is principally relied upon to demonstrate program effectiveness. However, the norm-referenced approach is supported with two comparison group designs in two of the school districts.

Instrumentation and Data Collection (1990 and 1996)

All studies reported used standardized achievement tests with established reliability and validity to evaluate the impact of ECRI. It has been verified with all the school districts involved that proper and appropriate data collection procedures were followed. In all cases, tests were administered according to the publishers' guidelines and within the recommended time frames for comparison with the normative sample. All the data reported were machine-scored by the publisher or by the district testing department. As a check on accuracy, samples of individual student scores were verified against publishers' manuals by an independent external evaluator. The credibility of the data is further established when one considers that the evaluations reported were designed by the districts to examine the worthiness of ECRI as a program for their schools.

Samples (1990)

Data are reported for the following groups of students:

Regular education students are those who received the ECRI program in their regular classrooms.

Bilingual students are those who received ECRI instruction in both Spanish and English in the regular classroom or in a special language teacher's classroom.

Title I (Chapter I) students are those who qualified for special assistance through the Title I (Chapter I) program. They typically received basic skills instruction in a small-group setting.

Remedial students are those who have been identified as needing additional reading instruction but who do not qualify for special education services.

Special education students are those who meet the federal definition of learning disabled and therefore qualify for and receive special education services.

The data reported were collected from eleven sites as follows:

Site 1: Morgan County, TN — Low SES, rural, Chapter I schools with 99% Caucasian student population. Four schools implemented ECRI (1988-89) as their regular reading instruction program at grades 2 through 7; one school provided comparison group data (Study 1).

Site 2: Oceanside, CA — An urban district with approximately 15,000 students. Oceanside is primarily blue collar and has a large minority population (30% Hispanic, 17% African American, 44% Caucasian, and 9% other). Mission School, which draws from the poorest neighborhoods in the district, provided ECRI achievement data from regular education students at grades 1-7 (Study 2); from a group of Spanish-speaking remedial students at grades 4-6 (Study 13); and from a group of fourth and fifth grade special education students (Study 16).

Site 3: Victorville, CA — Victor Union High School District draws from a very low SES catchment area of 32,000 people, the majority of which are associated with the local Air Force base. Forty-six (46%) of the students are from minority families, and 16% of the students receive free school lunches. ECRI data (1988-89) were provided from classes receiving reading and language instruction at grades 7-10 (Study 3) and from a group of special education students who received ECRI instruction in both a resource room and a mainstream setting (Study 17).

Site 4: Jackson, MI — This community is blue collar and 99% white. The data were drawn from a second-grade regular education class in the 1988-89 school year (Study 4). Eight of the students in the group were eligible for Chapter I services.

Site 5: Killeen, TX — Fort Hood army base provides the majority of students to this mid-sized Texas district. The student population is very transient and has a large minority (over 50%) population. The district provided three distinct samples of data from the 1985-86 school year: first, one group of regular education students (Study 5); second, a class of fifth grade Spanish-speaking students (Study 14); third, several groups of special education students (LD) who received ECRI instruction in a resource center setting (Study 15).

Site 6: Lexington, SC — This district provided impact data (1985-86) from a transitional class that offers students who are not experiencing success in the normal environment one additional opportunity before failure and/or expulsion (Study 7).

Site 7: Saluda County, SC — These schools draw from a low SES rural area of South Carolina and have a very high minority student population (60% African American). The ECRI group (1988-89) was comprised of Chapter I pull-out students (grades 2-4) who received reading instruction 40 minutes per day. Low motivation is the primary obstacle to instruction (Study 8).

Site 8: Sedro-Woolley, WA — This very rural district in Washington State serves a low SES community that is largely Caucasian and dependent on the lumber industry. Data (1988-89) are provided for special education students at grades 7 and 8 (Study 9).

Site 9: Calexico Unified Schools, CA — On the border of the U.S. and Mexico, this district is primarily blue collar. The classroom providing data (1987-88) was 100% Spanish (Study 10).

Site 10: Honolulu, HI — Shafter Elementary School in Honolulu provided data (1988-89) from four classrooms of regular education students at grades 1 and 2 (Study 6) and from a group of remedial reading students at grades 2-4 (Study 11). The students in these studies were for the most part minority children whose parents were employed at a military base.

Site 11: Grand Island, NE — This medium-sized city school district provided data from a first-grade regular education class (Study 12). The area is predominantly white, low to middle class, with much of the economy based on agriculture and the railroad.

Table 1: Summary of Impact Data (1990)

SITE	STUDY	n	SAMPLE	TEST USED
1. Morgan Co.	1	730	Reg. Ed.	SAT
2. Oceanside	2 13 16	412 40 9	Reg. Ed. Remedial Spec. Ed.	CTBS
3. Victorville	3 17	453 23	Reg. Ed. Spec. Ed.	CTBS
4. Jackson	4	25	Reg. Ed.	ITBS
5. Killeen	5 14 15	21 13 191	Reg. Ed. Bilingual Spec. Ed.	ITBS
6. Lexington	7	10	Reg. Ed.	CTBS
7. Saluda Co.	8	92	Chapter I	CTBS
8. Sedro-Woolley	9	24	Spec. Ed.	W-Johnson
9. Calexico	10	132	Bilingual	Nelson-Den.
10. Honolulu	6 11	61 17	Reg. Ed. Remedial	SAT
11. Grand Island	12	21	Reg. Ed.	CTBS
TOTAL		2274		

Samples (1996)

The data reported were collected from six sites as follows:

Site 1: Pickens County, AL — Low SES, Title I schools, ranging from predominantly African

American in some schools to predominantly Caucasian in others. Two schools implemented ECRI (1994-1995) in grades 2 through 5. A third school provided comparison group data.

Site 2: Robeson County, NC — Low SES, Title I, Tri-Racial: 50% Native American, 25% African American, 25% Caucasian. One elementary school implemented ECRI (1994-1995) and reported data for 11 teachers at grades 2 and 3.

Site 3: Salt Lake City, UT — Middle to upper SES, urban, private school implemented ECRI (1994-95) and reported data for 8 teachers at grades 1 through 8.

Site 4: Lamar County, AL — Low to Middle SES, 67% Caucasian, 33% African American, and two of the three schools are Title I schools. All three K-12 schools submitted data over a period of four years. Data were analyzed for gains over one, two, and three years (1991-1995).

Site 5: Jackson, MI — This community is blue collar, Middle Class, with 70% Caucasian and 30% Hispanic, Asian, and African American population. The data were drawn from a second-grade regular education class in the 1992-1993 school year.

Site 6: Austin, TX — Middle Class SES, approximately 85% Caucasian, 14% Hispanic, Asian and African American population. The data were drawn from a second grade regular education class (1992-1993).

Table 2: Summary of Impact Data (1996)

SITE	STUDY	n	TESTING DATES	TEST USED
1. Pickens County	1 2 3 4	503	Spring 1994 / Spring 1995	SAT
2. Robeson County	5	214	Spring 1994 / Spring 1995	SAT
3. Salt Lake City	6	118	Fall 1994 / Fall 1995	SAT
4. Lamar County	7 8 9 10	1099	Spring 1991 / 1992 / 1993/ 1994	SAT
5. Jackson	11	26	Spring 1992 / Spring 1993	ITBS
6. Austin	12	26	Spring 1992 / Spring 1993	ITBS
TOTAL		1986		

Results (1990)

A. REGULAR EDUCATION STUDENTS — GRADES 1-10

The primary source of evidence of the effectiveness of the ECRI approach with regular education students was gained through a study conducted by the Morgan County, Tennessee, public schools during the 1988-1989 school year at grades 2-7. In this district, four schools in their entirety used the ECRI approach, while a fifth school retained its existing commercial reading program and acted as a comparison. Using the Stanford Achievement Test, all students were pretested in the spring of 1988 as part of the district's testing program. The same students were then posttested in the spring of 1989 after a full year of instruction. When the data were treated with a repeated measures ANOVA, significant F ratios (interactions) were seen for all but one comparison (Table 3).

Table 3: Repeated Measures F Ratios and Probabilities
by Grade for Morgan County Study

		Reading Comprehension		Vocabulary	
Grade	df	F	p	F	p
2	183	50.03	.0000	86.55	.0000
3	184	20.26	.0000	3.21	.05
4	196	26.19	.0000	56.28	.0000
5	171	52.69	.0000	61.56	.0000
6	207	39.87	.0000	1.71	NS
7	206	13.68	.0003	15.39	.0001

Means, standard deviations, and gain scores are presented by grade in Table 4. As can be seen, all ECRI groups (grades 2-7) recorded significant ($p<.0000$), positive mean gains in both reading comprehension and vocabulary ranging from 7.55 to 14.10 NCEs and averaging 10.02 NCEs for comprehension and 8.80 NCEs for vocabulary. All comparison group gains, with the single exception of sixth-grade vocabulary, were nonsignificant or negative.

Table 4: Pre- and Posttest Means (NCEs), Standard Deviations, Gain Scores, and Correlated t-Tests for Treatment and Comparison Groups on the Comprehension and Vocabulary Sub-tests of the Stanford Achievement Test for the Morgan County Schools (Study 1)

READING COMPREHENSION

Grade	Group	N	Pre		Post		Gain	t	p
			x	sd	x	sd			
2	C	60	57.02	19.67	51.48	21.57	- 5.54	2.91	<.005>
2	T	125	52.14	19.48	61.84	17.38	9.70	8.21	.0000
3	C	72	55.74	18.67	56.59	18.03	0.85	0.55	NS
3	T	114	50.86	17.02	60.64	18.06	9.78	7.96	.0000
4	C	68	59.00	16.71	56.46	18.52	- 2.54	1.29	NS
4	T	130	48.55	20.96	57.70	21.53	9.15	7.06	.0000
5	C	66	56.56	20.94	54.15	15.40	- 2.41	1.54	NS
5	T	107	46.51	17.09	60.61	19.99	14.10	9.30	.0000
6	C	65	55.29	19.08	49.94	21.02	- 5.35	3.01	<.005>
6	T	114	45.11	20.58	55.01	22.45	9.90	7.01	.0000
7	C	68	49.93	17.04	50.76	15.64	0.83	0.49	NS
7	T	140	41.46	17.36	49.01	19.63	7.55	7.85	.0000

VOCABULARY

Grade	Group	N	Pre		Post		Gain	t	p
			x	sd	x	sd			
2	C	60	60.45	20.69	51.78	19.32	- 8.67	5.27	<.0000>
2	T	125	49.58	18.05	61.58	18.14	12.00	8.69	.0000
3	C	72	54.63	17.58	59.47	18.15	- 4.84	3.42	<.005>
3	T	114	50.35	16.45	58.21	16.83	7.86	7.38	.0000
4	C	68	56.67	17.30	49.97	17.50	- 6.70	3.93	<.001>
4	T	130	48.02	19.48	55.86	19.16	7.84	7.23	.0000
5	C	66	54.22	20.89	48.36	18.71	- 5.86	3.46	<.001>
5	T	107	46.54	17.66	55.29	18.31	8.76	8.53	.0000
6	C	65	50.56	20.36	56.18	20.81	5.62	3.06	.005
6	T	114	44.43	19.33	53.16	20.08	8.73	8.31	.0000
7	C	68	52.65	19.72	53.22	18.39	0.57	0.32	NS
7	T	140	41.95	16.47	49.62	17.59	7.67	8.42	.0000

Regular education reading data from further studies conducted by adopting schools are presented in Table 5. While a variety of different standardized tests were used, the results from each group are described in terms of "Total Reading" in NCE scores.

Table 5: Summary Table of Single Group Studies Conducted on Regular Education Students by Adopting Schools (Total Reading in NCEs)

			Pre		Post				
Study	Grade	N	x	sd	x	sd	Gain	t	p
2	1	18	22.44	20.74	50.88	13.64	+28.44	8.11	.0000
2	1	22	22.50	20.70	51.13	13.57	+28.63	6.25	.0000
6	1	20	36.60	28.43	63.85	24.44	+27.65	6.34	.0000
12	1	21	40.19	15.24	58.33	15.29	+18.14	5.46	.0000
2	2	23	39.17	16.91	54.91	19.33	+15.74	6.18	.0000
2	2	28	39.67	12.79	54.96	14.86	+15.29	7.17	.0000
4	2	25	40.84	20.11	53.24	22.98	+12.40	4.07	.0005
6	2	22	34.77	13.75	50.77	16.79	+16.00	6.30	.0000
6	2	19	39.00	25.11	51.42	21.16	+12.42	3.47	.005
2	3	21	37.43	17.74	45.90	16.23	+ 8.47	4.16	.0005
2	3	23	44.26	16.61	53.61	15.62	+ 9.35	4.60	.0001
2	4	25	46.44	18.78	60.76	19.52	+14.32	6.20	.0000
2	4	23	42.69	14.81	50.65	15.98	+ 7.96	5.02	.0000
2	4	23	42.30	18.08	52.52	20.56	+10.22	4.49	.0005
2	4	26	35.69	17.10	46.03	14.97	+10.34	4.84	.0000
2	5	26	35.77	16.99	47.92	14.54	+12.15	9.71	.0000
2	5	21	38.86	12.98	49.33	11.87	+10.47	5.71	.0000
2	5	23	37.69	22.50	44.61	19.61	+ 6.92	4.74	.0000
2	5	22	30.50	17.94	39.81	12.69	+ 9.31	4.53	.0005
5	5	21	65.14	18.14	76.33	14.19	+11.19	5.26	.0000
2	6	27	39.07	16.43	45.96	15.04	+ 6.89	5.62	.0000
2	6	26	42.81	14.71	47.65	13.48	+ 4.84	6.52	.0000
2	6	24	44.33	17.19	51.41	16.34	+ 7.08	4.25	.0005
2	6	24	39.50	17.87	47.71	16.85	+ 8.21	4.93	.0000
2	7	11	21.63	11.96	29.91	14.12	+ 8.28	3.10	.01
3	7	34	31.59	15.87	37.38	15.24	+ 5.79	4.11	.0005
7	7/8	10	42.20	13.59	54.20	11.69	+12.00	3.99	.005
3	8	86	35.68	13.54	39.81	13.15	+ 4.13	5.61	.0000
3	9	250	34.50	14.10	39.10	13.88	+ 4.60	9.47	.0000
3	10	83	27.47	9.97	31.56	11.71	+ 4.09	5.98	.0000

As can be seen, all 30 classes at all grade levels recorded significant positive ($p<.01$) NCE growth. Gains ranged from +28.63 for a class of first-grade students to +4.09 for 83 tenth-graders. The average gain across all studies exceeded 8.5 NCEs.

B. SPECIAL NEEDS STUDENTS (Chapter I, bilingual, remedial reading)

Data for special needs students—those requiring special reading assistance but not qualifying for special education services—were drawn from six different adoption sites which used a variety of standardized tests. These data are described in terms of Total Reading scores in NCEs and are presented in Table 6.

Table 6: Total Reading Composite Pre- and Posttest Means (NCEs), Standard Deviations, Gain Scores, and Correlated t-Tests, for ECRI Special Needs Groups

			Pre		Post				
Study	Grade	N	x	sd	x	sd	Gain	t	p
13	1	23	31.65	24.83	57.31	17.33	+25.66	6.67	.0000
8	2	12	7.08	11.33	34.84	11.34	+27.76	5.82	.0000
8	3	41	23.41	15.59	35.56	17.82	+12.15	4.76	.0000
13	3	5	27.80	13.79	39.40	12.11	+11.60	2.76	.05
8	4	39	30.59	10.37	38.58	13.58	+ 7.99	2.78	.01
11	2-4	17	21.41	6.45	36.12	12.47	+14.71	4.83	.0005
14	5	13	46.31	9.91	59.84	11.02	+13.53	4.99	.0005
13	4-6	12	45.00	11.00	51.41	10.09	+ 6.41	2.67	.05
10	7	27	13.00	6.67	32.14	11.67	+19.14	12.63	.0000
10	7	22	13.10	5.81	29.27	12.08	+16.17	12.08	.0000
10	7	23	14.39	7.37	34.17	12.64	+19.78	10.24	.0000
10	7	25	13.48	6.27	29.72	11.31	+16.24	8.64	.0000
10	7	25	14.08	5.44	27.48	9.56	+13.40	9.51	.0000

NCE gains for the special needs group ranged from 6.41 for a group of fourth- through sixth-grade remedial Spanish students to 27.76 for a group of second-graders in a transitional classroom. The average gain for these groups exceeded 14 NCEs. Correlated t-Tests between pre- and posttest means scores were significant ($p<.05$) for all 16 groups of students.

C. SPECIAL EDUCATION STUDENTS

Data for special education students—those qualifying for and receiving special education services— are described in terms of Total Reading scores in NCEs and are presented in Table 7.

NCE gains for the special education groups ranged from 7.30 for a group of eighth-graders to 24.93 for a special class of students at grades 2 through 5. The average gain for these groups exceeded 19 NCEs. Correlated t-Tests between pre- and posttest means scores were significant ($p<.05$) for all 14 groups of students.

Table 7: Total Reading Composite Pre- and Posttest Means (NCEs), Standard Deviations, Gain Scores, and Correlated t-Tests for ECRI Special Education Groups

Study	Grade	N	Pre		Post		Gain	t	p
			x	sd	x	sd			
15	2-4	28	22.85	15.88	46.14	14.32	+23.39	8.10	.0000
15	2-4	15	16.93	8.05	35.80	12.27	+18.87	5.07	.001
15	2-4	13	29.61	16.32	46.46	19.12	+16.85	5.03	.001
15	2-5	33	33.42	19.63	55.79	19.16	+22.37	9.92	.0000
15	2-5	20	34.40	12.54	57.00	16.66	+22.60	7.54	.0000
15	2-5	13	36.61	21.65	61.54	19.36	+24.93	8.69	.0000
15	2-5	11	29.27	14.15	44.00	14.86	+14.73	6.29	.0000
15	2-5	12	27.92	20.02	48.50	20.01	+20.58	4.20	.0000
15	2-5	18	23.94	9.65	41.61	13.43	+17.67	6.46	.0000
15	2-5	28	39.50	16.18	63.43	10.94	+23.93	7.45	.0000
16	4/5	9	19.78	16.06	28.33	15.56	+ 8.55	2.71	.05
9	7	10	27.40	11.12	35.00	5.97	+ 7.60	2.83	.05
9	8	14	20.92	9.29	31.64	10.87	+10.72	4.18	.001
17	8	23	20.17	10.62	27.47	11.15	+ 7.30	4.01	.001

Results (1996)

In the Pickens County, Alabama, district two schools implemented the ECRI program at grades 2-5, while a third school retained its existing program and acted as a comparison. Using the Stanford Achievement Test, all students were pretested in the spring of 1994 as part of the district's testing program. The same students were posttested in the spring of 1995 after a full year of instruction. When the data were treated with a repeated measure ANOVA, significant F ratios were found (Table 8).

Table 8: Pickens County, AL, Experimental Comparison Study
Repeated Measures F Ratios and Probabilities by Grade (Study 1)

Grade	Design	Area	Experimental vs Control on Pretest to Posttest Gain F	p	df
2	Experimental School #1: 1 class Experimental School #2: 1 class Control School: 1 class	Reading Comprehension	15.4**	.000	1,49
3	Experimental School #1: 1 class Control School: 1 class	Total Reading	5.2*	.028	1,40
4	Experimental School #1: 1 class Experimental School #2: 1 class Control School: 1 class	Total Reading	12.2**	.001	1,114
5	Experimental School #1: 1 class Experimental School #2: 1 class Control School: 2 classes	Total Reading	29.6**	.000	1,189

* p<.05
** p<.01

Means, standard deviations, and gain scores are presented in Table 9. As can be seen, five ECRI groups recorded significant scores in comprehension and total reading, ranging from 4.3 to 8.4 NCEs and averaging a gain of 5.1 NCEs. All comparison group gains were nonsignificant or negative.

Table 9: Pre- and Posttest Means (NCEs), Standard Deviations, Gain Scores, and Correlated t-Tests for Treatment and Comparison Groups on the Comprehension and Total Reading Sub-tests of the Stanford Achievement Test for the Pickens County Schools, AL (Studies 2, 3, 4)

Grade at Post-testing	Area	N	Pretest $\bar{X}$	Pretest SD	Posttest $\bar{X}$	Posttest SD	Gain $\bar{X}$	Gain SD	t	p	df
Pickens County Exp 1 (by grade)											
2	Compr	22	38.6	5.7	43.2	9.8	4.6	8.2	2.7*	.015	21
3	Tot Rdg	19	38.0	12.2	38.0	11.5	0.0	8.1	0.0	.993	18
4	Tot Rdg	19	29.9	11.1	38.3	10.1	8.4	7.7	4.7**	.000	18
5	Tot Rdg	60	51.6	16.1	55.9	15.4	4.2	7.4	4.5**	.000	59

* p<.05
** p<.01

continued

Grade at Post-testing	Area	N	Pretest X	Pretest SD	Posttest X	Posttest SD	Gain X	Gain SD	t	p	df
Pickens County Exp 2 (by grade)											
2	Compr	17	40.3	6.7	42.8	10.8	2.4	10.3	1.0	.342	16
3	Compr	73	37.5	15.0	41.8	16.6	4.3	12.0	3.0**	.003	72
4	Tot Rdg	96	34.1	16.0	38.4	15.3	4.3	9.7	4.3**	.000	95
5	Tot Rdg	18	40.9	15.1	43.2	14.2	2.3	6.9	1.5	.166	17
Pickens County Ctl 3 (by grade)											
2	Compr	12	42.1	5.6	32.7	12.5	-9.4	13.0	-2.5*	.029	11
3	Tot Rdg	23	37.1	10.3	31.5	13.1	-5.6	7.8	-3.5**	.002	22
4	Tot Rdg	31	24.6	10.6	22.8	10.3	-1.8	9.7	-1.0	.312	30
5	Tot Rdg	24 89	37.6 35.7	19.1 13.7	33.0 32.8	21.3 15.0	-4.7 -2.8	14.1 8.1	-1.6 -3.3**	.120 .001	23 88

* p<.05
** p<.01

Means, standard deviations, and gain scores are presented in Table 10 for the Robeson County, North Carolina, school. All ECRI groups made significant gains on the Stanford Achievement Test at the second and third grade levels. Data presented were from scores available at the two grade levels.

Table 10: Pre- and Posttest Means (NCEs), Standard Deviations, Gain Scores, and Correlated t-Tests on the Vocabulary, Comprehension, and Total Reading Sub-tests of the Stanford Achievement Test for ECRI Students in Robeson County, NC (Study 5)

Grade at Post-testing	Area	N	Pretest X	Pretest SD	Posttest X	Posttest SD	Gain X	Gain SD	t	p	df
2	Tot Rdg	96	51.2	21.4	59.7	18.3	8.5	12.7	6.5**	.000	95
3	Vocab Compr	118 117	51.4 50.3	19.9 21.5	56.8 56.3	19.3 18.3	5.4 6.0	14.7 14.9	4.0** 4.4**	.000 .000	117 116

** p<.01

The NCE gains ranged from 12.7 to 14.9 NCEs and averaged 14.1 NCEs.

Means, standard deviations, and gain scores of testing with the Stanford Achievement Test are presented in Table 11 for grades 1 through 8 in the Salt Lake City, Utah, school. Significant gains (p<.01) were made on 23 sub-tests.

Table 11: Pre- and Posttest Means (NCEs), Standard Deviations, Gain Scores, and Correlated t-Tests on the Total Reading, Vocabulary, and Comprehension Sub-tests of the Stanford Achievement Test for the Salt Lake City, Utah, school (Study 6)

Grade at Post-testing	Area	N	Pretest $\bar{X}$	Pretest SD	Posttest $\bar{X}$	Posttest SD	Gain $\bar{X}$	Gain SD	t	p	df
1	Tot Rdg	15	50.3	20.8	67.1	26.2	16.8	13.4	4.9**	.000	14
	Vocab		49.4	19.9	67.0	21.9	17.6	10.2	6.7**	.000	14
	Compr		43.2	25.4	68.7	25.7	25.6	21.3	4.7**	.000	14
2	Tot Rdg	16	44.4	27.8	63.8	23.8	19.3	14.5	5.3**	.000	15
	Vocab		43.9	19.8	61.8	20.6	17.9	11.0	6.5**	.000	15
	Compr		40.2	27.9	66.6	20.0	26.4	16.1	6.6**	.000	15
3	Tot Rdg	13	46.2	18.0	60.2	19.5	14.0	10.0	5.0**	.000	12
	Vocab		46.1	18.2	62.3	17.3	16.2	11.4	5.1**	.000	12
	Compr		43.6	17.2	56.4	12.0	12.8	12.8	3.6**	.004	12
4	Tot Rdg	17	45.8	21.1	62.4	18.4	16.7	9.8	7.1**	.000	16
	Vocab		43.7	20.8	65.7	17.4	22.0	12.2	7.4**	.000	16
	Compr		45.2	19.4	60.9	18.8	15.8	11.1	5.8**	.000	16
5	Tot Rdg	11	58.4	20.2	72.4	19.1	14.0	12.9	3.6**	.005	10
	Vocab		50.8	21.6	71.2	23.9	20.4	13.7	4.9**	.001	10
	Compr		61.3	21.3	73.4	15.7	12.2	22.6	1.8	.104	10
6	Tot Rdg	16	52.9	17.5	62.5	13.9	9.6	7.7	5.0**	.000	15
	Vocab		54.0	16.2	67.2	17.2	13.1	11.3	4.7**	.000	15
	Compr		51.8	17.1	59.2	12.1	7.5	9.2	3.3**	.005	15
7	Tot Rdg	20	54.3	19.4	67.7	18.2	13.4	13.7	4.4**	.000	19
	Vocab		54.5	19.2	67.5	17.9	13.0	13.0	4.5**	.000	19
	Compr		53.3	18.2	65.4	17.1	12.1	12.5	4.3**	.000	19
8	Tot Rdg	10	54.3	21.7	70.6	16.7	16.3	16.0	3.2**	.010	9
	Vocab		53.6	19.8	72.6	18.4	19.0	15.0	4.0**	.003	9
	Compr		54.9	16.9	69.0	17.0	14.1	14.3	3.1*	.013	9

* $p<.05$
** $p<.01$

NCE gains ranged from +26.4 for a class of second grade students to +7.5 for a class of sixth grade students. The average gain across all grades and sub-tests exceeded 16 NCEs.

In the Lamar County, Alabama, district all three schools implemented the ECRI program. All students were tested in the spring of each year with the Stanford Achievement Test. Data were obtained for the 1991, 1992, 1993, and 1994 years. Means, standard deviations, and gain scores are presented in Table 12 for the Comprehension sub-test for students tested after one, two, and

three years in the program.

Table 12: Pre- and Posttest Means (NCEs), Standard Deviations, Gain Scores, and Correlated t-Tests on the Comprehension Sub-test of the Stanford Achievement Test for Lamar County, AL (Studies 7, 8, 9, 10)

Grade at Post-testing	Area	N	Pretest X̄	Pretest SD	Posttest X̄	Posttest SD	Gain X̄	Gain SD	t	p	df
Lamar County Cohorts 93, 94, 95											
2	Compr	20	30.0	17.5	38.3	13.0	8.3	8.8	4.2**	.000	19
		27	22.6	8.0	32.9	10.1	10.3	10.0	5.3**	.000	26
		16	24.7	10.2	37.4	9.8	12.7	9.4	5.4**	.000	15
3	Compr	16	20.3	13.9	26.8	12.6	6.5	7.4	3.5**	.003	15
		25	22.0	9.7	28.6	8.9	6.6	6.0	5.5**	.000	24
		33	24.2	11.4	31.9	12.7	7.7	11.8	3.7**	.001	32
4	Compr	49	22.4	10.0	32.6	13.5	10.2	11.5	6.2**	.000	48
		45	22.9	12.7	31.8	13.0	8.9	9.6	6.2**	.000	44
		50	22.2	11.3	32.8	13.4	10.6	10.6	7.0**	.000	49
5	Compr	26	31.3	12.6	37.6	14.2	6.3	6.4	5.0**	.000	25
		40	27.9	13.0	36.5	10.8	8.7	9.0	6.1**	.000	39
		78	38.9	19.7	44.0	19.0	5.2	8.8	5.2**	.000	77
6	Compr	37	27.0	9.6	36.4	8.7	9.4	9.1	6.3**	.000	36
		41	24.9	7.6	35.3	9.4	10.4	7.1	9.3**	.000	40
		42	29.5	11.6	37.7	13.2	8.2	8.9	6.0**	.000	41
7	Compr	19	26.3	13.4	34.3	12.0	8.0	6.7	5.2**	.000	18
		7	25.7	12.3	34.2	9.8	8.5	10.7	2.1	.080	6
		22	31.0	11.0	40.9	17.5	9.9	11.8	3.9**	.001	21
8	Compr	24	28.9	10.8	36.5	9.2	7.5	9.1	4.0**	.001	23
		37	44.1	22.4	52.7	22.1	8.6	9.7	5.4**	.000	36
		30	46.0	25.1	53.9	25.2	7.9	6.8	6.4**	.000	29
Lamar County Cohorts 95											
9	Compr	108	39.7	19.3	47.3	20.0	7.6	8.0	9.8**	.000	107
Lamar County 2-Year Gains											
6	Compr	94	42.6	17.8	52.4	18.1	9.9	8.5	11.2**	.000	93
7	Compr	17	31.6	11.1	37.5	10.9	5.9	5.1	4.8**	.000	16
10	Compr	79	46.6	19.6	55.1	18.6	8.5	8.3	9.1**	.000	78

** p<.01

continued

Lamar County 3-Year Gains

7	Compr	51	54.5	16.8	63.8	19.0	9.2	10.1	6.5**	.000	50
11	Compr	66	41.6	19.4	48.1	17.5	6.5	7.7	6.9**	.000	65

** p<.01

Gains over a one-year period of time from one spring to the next spring ranged from 5.2 to 12.7 NCEs with a median gain of 9.5 NCEs. The students tested over a two-year period of time had a median gain of 8.1 NCEs and ranged from 5.9 to 9.9 NCEs. The NCE gains after three years ranged from 6.5 to 9.2 with a median gain of 7.85 NCEs. Significant gains (p<.01) were made on 26 subtests.

Second grade students in the Northwest School District, Michigan, and Austin Independent School District, Texas, were tested in the spring of 1992 and the spring of 1993 with the Iowa Test of Basic Skills. Means, standard deviations, and gain scores are presented in Table 13 for the Vocabulary and Comprehension sub-tests.

Table 13: Pre- and Posttest Means (NCEs), Standard Deviations, Gain Scores, and Correlated t-Tests on the Vocabulary and Comprehension Sub-tests of the Iowa Test of Basic Skills in Northwest School District, MI and Austin ISD, TX (Studies 11 and 12)

Grade at Post-testing	Area	N	Pretest $\bar{X}$	Pretest SD	Posttest $\bar{X}$	Posttest SD	Gain $\bar{X}$	Gain SD	t	p	df
Northwest School District, MI											
2	Vocab	26	47.5	15.7	52.5	18.3	5.1	11.6	2.2*	.035	25
	Compr		42.0	23.6	50.0	22.6	8.0	13.6	3.0**	.006	25
Austin ISD, TX											
2	Vocab	14	65.9	18.6	91.6	14.4	25.7	14.7	6.5**	.000	13
	Compr		66.3	17.0	79.4	14.8	13.1	15.0	3.3**	.006	13

* p<.05
** p<.01

Significant gains (p<.05) were made on all tests. NCE gains ranged from 5.1 to 25.7 and averaged 13.

Interpretation and Discussion of Results (1990 and 1996)

A. RELATIONSHIP BETWEEN TREATMENT AND EFFECT

Evidence that supports each of the claims of effectiveness has been presented. The combination of a comparison group design with norm-referenced measures and the consistency and size of the gains across more than 200 separate groups and over 4000 students make the data unequivocally supportive of the effectiveness of the program.

Even in the absence of comparison group data for all the districts, the norm-referenced approach effectively controls for maturation and testing, the two major rival threats to internal validity. Given the consistency of the effects across such a large number of groups, it is unlikely that statistical regression, attrition, or the unique effect of the teacher were operative.

B. SIGNIFICANCE OF RESULTS

There is no question that the data presented are exemplary. For the regular education group in the 1990 studies, gains ranged from .4 to 1.5 standard deviations with a median gain in excess of .5 s.d. In a more interpretable metric, gains for the same group ranged from 4 to 28 NCEs and averaged in excess of 8.5 NCEs. For the special needs and special education groups, the typical gain exceeded a full standard deviation and approached 15 and 20 NCEs, respectively. By any standard, gains of these magnitudes are exemplary.

In the 1996 studies, univariate statistics on pretest, posttest, and gain scores (pretest-to-posttest differences) indicate that in nearly every case, classes receiving ECRI-based reading instruction posted statistically significant, positive gains from pretest to posttest. Data were presented for students over two and three years as well as for one year.

In the Salt Lake City school, gains ranged from .5 to 1.15 standard deviations with a median gain of .8. The NCE gains ranged from 7.5 to 26.4 and averaged 16.1 NCEs.

In Lamar County for students over a one-year testing period, gains ranged from .27 to 1.27 standard deviations with a median gain of .7. The standard deviation gains of students tested over a two-year period of time ranged from .44 to .55. The median gain was .5. For students tested over three years the range was .35 to .86, and the median gain was. .48. The NCE gains after one-year in the program ranged from 5.2 to 12.7 with a median gain of 9.5 NCEs. The NCE gains after two years ranged from 5.9 to 9.9 with a median gain of 8.1 NCEs. The NCE gains after three years ranged from 6.5 to 9.2 with a median gain of 7.85 NCEs.

For students in Robeson County, gains ranged from .17 to .43 standard deviations with a median gain in excess of 3.0. The NCE gains ranged from 12.7 to 14.9 NCEs and averaged 14.1 NCEs.

Gains for all students ranged from .16 to 1.55 standard deviations with a median gain in excess of .6 s.d. The NCE gains ranged from 4.3 to 26.4 and averaged 11 NCEs.

For most projects, the gains described above would be considered suspiciously large. ECRI, however, is not an ordinary project. Its focus on individualized instruction and mastery learning and its emphasis on positive reinforcement and high performance expectations set it apart from most programs. ECRI instruction is powerful and intense. Once a teacher is comfortable with the instructional style which demands a great deal of change for most teachers, ECRI techniques begin to permeate the classroom and the entire curriculum. The cumulative effect is an extremely positive environment with learning as its primary focus.

Evidence has been presented which testify to the effectiveness of the ECRI approach across a wide variety of learning environments and with the full spectrum of ability levels. The effects have been consistent and reliable. Moreover, as mentioned previously, the data mirror evidence previously presented to the JDRP/PEP and the numerous formal and informal evaluations received from sites across the country.

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The need for solid programs in the basic skills has never been greater than it is today. The ability to read is the cornerstone on which other skills are built. As such, it demands an emphasis greater than it has recently received in our schools. Additionally, it demands programs which are exemplary. As observed in the data presented in this document, ECRI is one of those programs.